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Written on JULY 22, 2014 AT 1:53 PM by SVANDERWERFF

An Untapped Ocean of Opportunity, Part I

Filed under NAVY HISTORY, RESEARCH AND DEVELOPMENT, UNCATEGORIZED

(NO COMMENTS)

By Naval Medical Research Center News



“Knowledge of the oceans is more than a matter of curiosity. Our very survival may hinge upon it.”

~President John F. Kennedy

While NASA’s Project Mercury was transporting public imagination to the stars, a lone Navy Diving and Submarine Medical Officer looked to the seas as the new frontier of exploration and habitation.

In 1958, Cmdr. George Bond, (later Captain) a leader in the field of undersea and hyperbaric medicine proposed an ambitious plan of underwater research that seemed to be inspired by the writings of science fiction author Jules Verne. What Bond saw was a literal untapped ocean of opportunity for mineral mining, marine archeology, biology and colonization that could lead to discoveries of




Navy deep sea diver qualification insignia’s are awarded in four degrees: Second Class Diver; First Class Diver; Master Diver and Diving Officer. Diving Medical Officer and Diving Medical Technician insignia’s are awarded to naval medical personnel qualified as divers or medical technicians.

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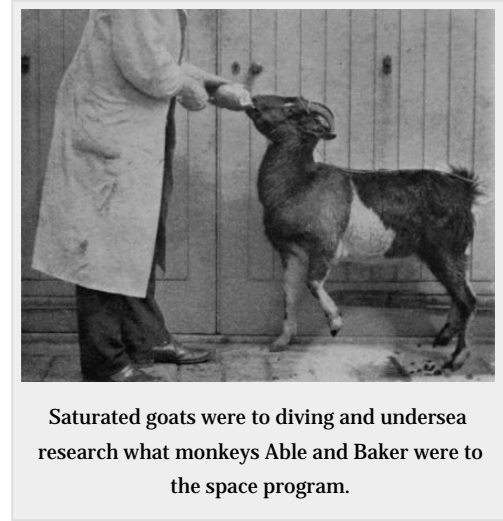
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new medicines and harvestable resources.

However, prior to executing his bold idea Bond spearheaded Project Genesis (1957-1963), the first study of saturation diving in an artificial environment. So named for the biblical prophecy of man’s “dominion over the sea,” the experiments simulated a subsurface environment in a hyperbaric chamber and tested an assortment of gas mixtures that could be used by humans living in an ocean habitat.

The experiments took place at the Naval Submarine Medical Research Laboratory in New London, Conn. and the Naval Medical Research Institute in Bethesda, Md. andwere overseen by Bond and undersea medical officers Commanders Walt Mazzone and Robert Workman (both would become Captain’s). Bond and his team studied an assortment of animals and later humans related to various pressures and gases in the pressurized chamber. Goats were chosen as the preferred standard test subject because of their similarity to human anatomy.



Ben Hellwarth, author of *SEALAB: America’s Forgotten Quest to Live and Work on the Ocean Floor* would assert that the “saturated goats” were to diving and undersea research what monkeys Able and Baker were to the space program. In 1962, Bond, Mazzone and Workman published their initial findings in *Genesis: Prolonged Exposure of Animals to Pressurized Normal and Synthetic Atmospheres*.

The project would ultimately culminate in August and September of 1963 when a Navy medical officer and two chief petty officers spent 12 days at a simulated record ocean depth of 200 feet while

breathing artificial air, successfully proving that humans in a saturated state could perform useful functions for extended periods of time underwater. Over the next decades, Genesis findings would unlock potential for marine research, construction, and salvage operations while paving the way for underwater habitation projects of Jacques Cousteau, Edward Link and Bond’s experimental underwater habitat SEALAB.

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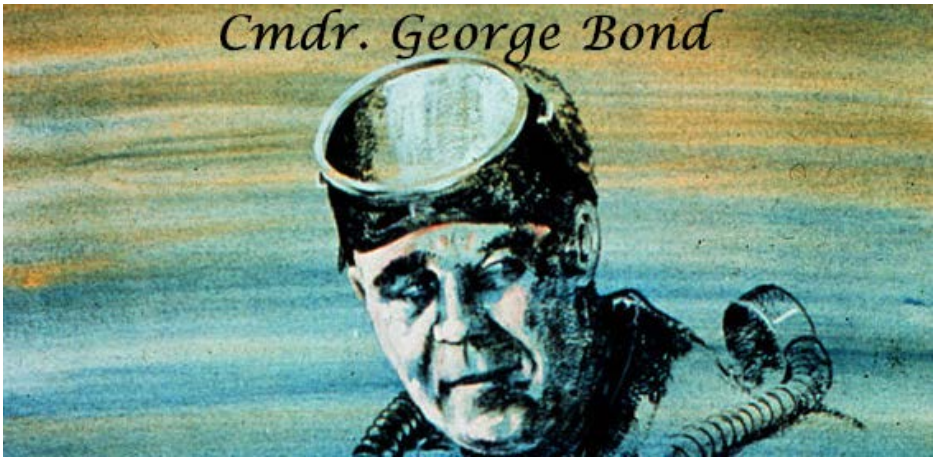
Written on JULY 31, 2014 AT 5:45 AM by SVANDERWERFF

An Untapped Ocean of Opportunity, Part II

Filed under [NAVY HISTORY](#) [RESEARCH AND DEVELOPMENT](#)

(NO COMMENTS)

By NMRC News



The World of Undersea Research

“In the habitat at the end of a busy day looking out a port is in itself a pleasure. There’s a lot to see down there if you just have the time. It was like a reversed fish bowl. You get where you recognize fish and other critters. I can remember giving all our fish names and even wondering where they were on the days when we failed to see them.”

~QMC Bob Barth, Aquanaut, SEALAB II

Bond’s research spawned an undeniable race to establish the first underwater habitat. In September 1962, industrialist and inventor of the flight simulator, Edwin Link launched the first and smallest of all the underwater habitats. Measuring just 11 feet high by three feet wide, its sole inhabitant—diver Robert Sténuit would spend 25 hours at 200 feet below the surface, earning him the distinction as the “world’s first aquanaut.”

Jacques Cousteau, underwater researcher and conservationist followed a week later. , On Sept. 14, 1962, he launched the first of three continental shelf stations (CONSHELF). Since the beginning of Project Genesis, Bond and Cousteau had been philosophical compatriots in the cause of saturation diving and had freely shared ideas with one another. The U.S. Navy Medical Department had a special relationship with Cousteau extending back

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SEALAB was submerged 193 feet below the surface in warm and clear waters, 30 miles southwest of Bermuda.

to the early 1950s. While with the experimental diving unit, Navy medical officer Lt. Cmdr. Charles Waite (later Rear Adm.) became the first American physician to test Cousteau’s self-contained underwater breathing apparatus or SCUBA.

Bond’s fellow undersea medical officer, Lt. Cmdr. Charles Aquadro, served as an observer for the CONSHelf project, and would later work for Cousteau as a civilian. In 1964, while Cousteau was filming “World Without Sun,” a documentary about CONSHelf III, Bond’s vision of underwater life had germinated into SEALAB. Designed by the U.S. Mine Defense Laboratory in Panama City, Fla., the SEALAB habitat was constructed out of two torpedo-like mine floats measuring 60 feet in length.

SEALAB was submerged 193 feet below the surface in warm and clear waters, 30 miles southwest of Bermuda. Habitation commenced July 20, 1964. SEALAB’s “crew” included Chief Quartermaster Bob Barth, Gunner’s Mate 1st Class Lester “Andy” Anderson, Navy physician Lt. Robert Thompson, and Chief Hospital Corpsman Sanders “Tiger” Manning. *Mercury* astronaut Lt. Cmdr. Scott Carpenter, USN was selected for the mission but had to sit out the first phase of SEALAB because he was covering from injuries due to a motorbike accident on Bermuda. The aquanauts took daily swims outside the habitat collecting Marine specimens, feeding fish, and conducting physiological tests.



They enjoyed daily meals that included corned beef hash, Chinese food, tamales, roast beef, sweet potatoes, and coffee.

They enjoyed daily meals that included corned beef hash, Chinese food, tamales, roast beef, sweet potatoes, and coffee. Other SEALAB “amenities” included warm showers, books, a chess board and communication devices connecting them “topside” where Bond and medical officer Walter Mazzone monitored the crew around the clock.

Due to the helium rich atmosphere of the habitat, the aquanauts spoke in high-pitched squeaks and were required to use a “speech normalizer” to ensure intelligibility in communicating topside. Andy Anderson would famously inaugurate

the system with a rendition of “O Sole of Mio.”

Although scheduled to last three weeks, the SEALAB experiment shortened to ten days because of an approaching hurricane. The SEALAB habitat was raised three feet an hour and adjustments were made to breathing gas mixture, accordingly.

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Before reaching the surface the aquanauts spent two days in a submersible decompression chamber before being released. Despite suffering mild nitrogen narcosis, the aquanauts didn’t experience any major physiological effects of exposure to deep sea conditions.

The experiment provedthat humans could fully integrate with the ocean environment and complete daily tasks while submerged 200 feet below the surface.

The first government-sponsored underwater habitat, SEALAB was deemed a resounding success and in January 1965 the Navy authorized the continuation of the project.

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Written on AUGUST 7, 2014 AT 2:33 PM by SVANDERWERFF

An Untapped Ocean of Opportunity, Part III

Filed under NAVY HISTORY, RESEARCH AND DEVELOPMENT

(NO COMMENTS)

By NMRC News



“If need be, we could work well into the night as it didn’t make a lot of difference to the bottom dwellers. Days looked like nights; it was dark on the bottom all the time.”

~QMC Bob Barth, Aquanaut, SEALAB II

Commencing August 28, 1965, SEALAB II was an ambitious and, arguably, the most successful of the U.S. Navy’s missions to gauge the capabilities of saturation diving and undersea habitation. Planted 205 feet below the ocean surface off the coast of La Jolla, Calif., SEALAB II was a 57-foot habitat that contained a special laboratory, a watch station, a galley, showers, toilets, eleven viewing ports, and living space for 10 aquanauts at a given time.



Aboard SEALAB I at a depth of 192 feet below sea surface.

Over the course of its 45-day mission, the SEALAB capsule accommodated three teams of 10 divers (each team in 15-day increments); these aquanauts would amass a total of 450 saturation dive hours outside the habitat conducting plankton sampling, bioluminescent studies, marine life census while continuing the human and animal physiological studies of


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the previous mission.



Former Mercury astronaut, Cmdr. Scott Carpenter and Navy physician Lt. Cmdr. Robert Sonnenberg were the only aquanauts to spend one-month below the surface.

Former Mercury astronaut, Cmdr. Scott Carpenter served as leader for two of the three rotating teams and was only one of two aquanauts to spend one-month below the surface (the other being Navy physician Lt. Cmdr. Robert Sonnenberg). Early in the mission Carpenter made history communicating via “earthlink” with astronaut Gordon Cooper who was then orbiting the planet in his Gemini spacecraft some eight atmospheres away.

This first “Sea-to-Sky” communication feat was soon followed by the first “Sea-to-Sea Habitation” link when SEALAB II exchanged messages with Cousteau’s CONSHELF III crew then submerged 330 feet off of Villefranche-sur-Mer in the Mediterranean.



Tuffy transported much needed supplies and tools to the aquanauts and performed “lost diver” drills.

SEALAB II also featured the services of a Navy-trained dolphin named “Tuffy.” As the unsung 29th member of the team, Tuffy transported much needed supplies and tools to the aquanauts and performed “lost diver” drills. Aquanaut Bob Barth would later recall his first encounter with his bottled-nose colleague.

“Ken [Conda] and I would go outside when the folks topside would tell us they were ready to send Tuffy down. We would wander away from the habitat...and Ken would turn on the pinger device he carried. Before too long, there would be a streaking shadow and a giant swoosh, and then this damn big fish would be sitting right in front of us smiling. The first time that he roared down on us scared the hell out of me.”



Drs. Walter Mazzone and George Bond, right, inside the communications center of SEALAB I.

The success of SEALAB II ensured the continuation of the project and in February 1969, the third phase was launched. Now 45-aquanaut strong (five teams of nine), the SEALAB III habitat was submerged 610-feet below the ocean surface off San Clemente Island, Calif.. Immediately, the habitat (a modified SEALAB II capsule) began to leak and teams of aquanauts were sent down to conduct repairs.

On one such visit, aquanaut Berry Cannon died suddenly of what was later determined to be carbon dioxide poisoning on account of a faulty “re-breather.” With Cannon’s death, and fear of

bad publicity, the third phase of the program, as well as the program had been itself was cancelled. In frustration, an aquanaut commented that the mission to the moon survived three astronaut deaths, and no one in that program quit; rather, it drove NASA to “bigger and better things.”

Bond’s dream may have dimmed a little with the end of

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SEALAB, but it didn't die. From Tektite to Aquarius, saturation diving and under water habitats stretched the boundaries of scientific knowledge. To date, the limitations of underwater habitation has been stretched to more than 69 days and saturation dives over 2,000 feet. Although, Bond would not live to see vast human colonies under the sea, his legacy and his recognition as one of the first “dreamers” lives on today.

Bond would serve as a namesake for future underwater habitat projects and an ocean simulation facility. In 2013, Bond was posthumously awarded the “Diving Pioneer Award” by the Historical Diving Society and was the focus of Ben Hellwarth's seminal book, *SEALAB: America's Forgotten Quest to Live on the Ocean Floor* (2012).

References for Parts I,II and III

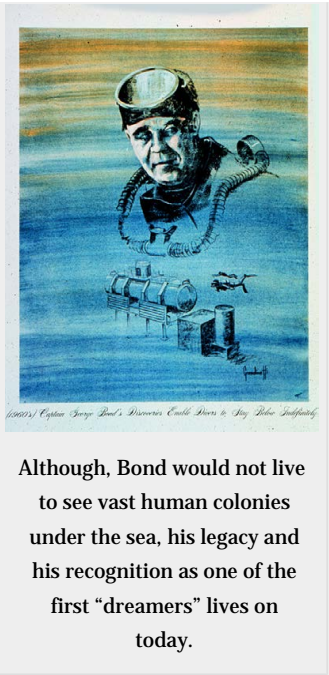
Barth, Bob. *Sea Dwellers: The Humor, Drama and Tragedy of the U.S. Navy SEALAB Programs*. Houston, TX: Doyle Publishing. 2000.

Bond, George. SEALAB II Chronicles. BUMED Archives.

Chamberland, Dennis. SEALAB: Unfinished Legacy. *Naval Institute Proceedings*, January 1986. pp72-82.

Hellwarth, Ben. *SEALAB: America's Forgotten Quest to Live on the Ocean Floor*. New York, NY: Simon & Shuster. 2012.

Thompson, Robert. “SEALAB I: A Personal Documentary Account.” *Memorandum Report No. 66-9*. 30 March 1966.



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